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ORIGINAL REPORT

Prospective Study of Psychosocial Outcomes of Having Contralateral Prophylactic Mastectomy Among Women With Nonhereditary Breast Cancer

Patricia A. Parker, Susan K. Peterson, Yu Shen, Isabelle Bedrosian, Dalliah M. Black, Alastair M. Thompson, Jonathan C. Nelson, Sarah M. DeSnyder, Robert L. Cook, Kelly K. Hunt, Robert J. Volk, Scott B. Cantor, Wenli Dong, and Abenaa M. Brewster

Author affiliations and support information (if applicable) appear at the end of this article.

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Corresponding author: Patricia A. Parker, PhD, Memorial Sloan Kettering Cancer Center, 641 Lexington Ave, 7th Floor, New York, NY 10022; e-mail: parkerp@mskcc.org.

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ABSTRACT

Purpose
The incidence of contralateral prophylactic mastectomy (CPM) has continued to increase. We prospectively examined psychosocial outcomes before and up to 18 months after surgery in women who did or did not have CPM.

Methods
Women with unilateral, nonhereditary breast cancer completed questionnaires before and 1, 6, 12, and 18 months after surgery. Primary psychosocial measures were cancer worry and cancer-specific distress. Secondary measures were body image, quality of life (QOL), decisional satisfaction, and decisional regret.

Results
A total of 288 women (mean age, 56 years; 58% non-Hispanic white) provided questionnaire data, of whom 50 underwent CPM. Before surgery, women who subsequently received CPM had higher cancer distress ($P = .04$), cancer worry ($P < .001$), and body image concerns ($P < .001$) than women who did not have CPM. In a multivariable repeated measures model adjusted for time, age, race/ethnicity, and stage, CPM was associated with more body image distress ($P < .001$) and poorer QOL ($P = .02$). There was a significant interaction between time point and CPM group for cancer worry ($P_{interaction} < .001$), suggesting that CPM patients had higher presurgery cancer worry, but their postsurgery worry decreased over time and was similar to the worry of patients who did not have CPM. QOL was similar between CPM groups before surgery but declined 1 month after surgery and remained lower than patients who did not have CPM after surgery ($P_{interaction} = .05$).

Conclusion
These results may facilitate informed discussions between women and their physicians regarding CPM. Fear and worry may be foremost concerns at the time surgical decisions are made, when women may not anticipate the adverse future effect of CPM on body image and QOL.

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INTRODUCTION

Advances in screening and treatment have resulted in a significant reduction in breast cancer mortality over the past several decades.[1,2] Among women with hormone receptor–positive breast cancers, adjuvant treatment with tamoxifen or aromatase inhibitors reduces the risk of developing a contralateral breast cancer by approximately 50%.[3,4] Despite these major achievements, the incidence of contralateral prophylactic mastectomy (CPM) has increased for all women with unilateral breast cancer.[5,6] CPM has not been associated with reduced mortality.[7] Our previous study found that before meeting their surgeon, 59% of women with nonhereditary breast cancer reported that they had at least some interest in CPM.[8] This suggests that the increasing rate of CPM may be largely patient rather than provider driven.

An important gap in knowledge is how undergoing CPM affects the psychosocial adjustment after surgery among women with early-stage nonhereditary breast cancer. Rolnick et al[9] examined what women wished they had known before prophylactic breast surgery and found that 58% of women wished they had more

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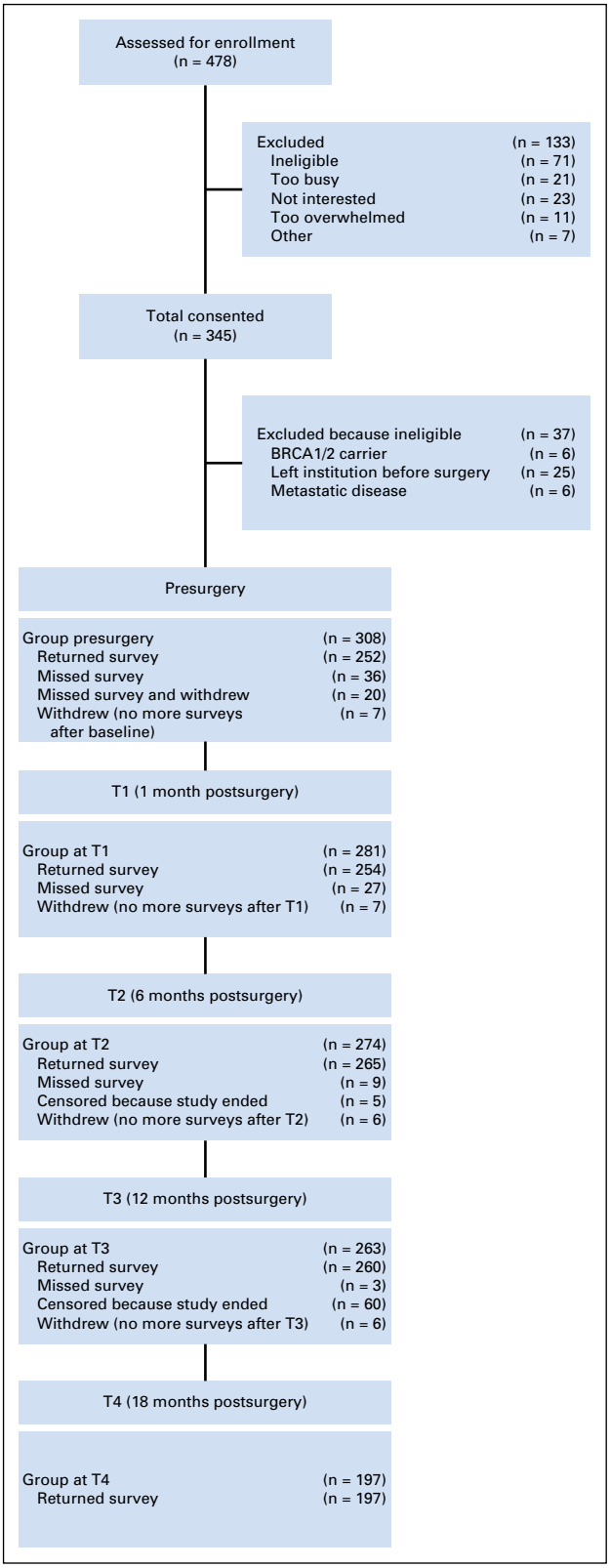

Fig 1. CONSORT diagram.

information about the potential for negative emotions they may experience after surgery. To facilitate informed decision making, it is essential to provide women and their physicians with information about the long-term psychosocial effect of undergoing CPM. Recent studies have shown that the decision to have CPM is not entirely based on knowledge about survival outcomes. Psychosocial factors, such as worrying about developing a second cancer[8] and wanting peace of mind,[10] also play a significant role in a woman's decision to have CPM. However, whether having CPM reduces cancer worry and cancer distress after surgery is not known. Alternative nonsurgical interventions have shown efficacy in reducing fear of cancer recurrence and cancer distress among women with early-stage breast cancer.[11]

The studies that have evaluated psychosocial outcomes, including quality of life (QOL), decisional satisfaction, and decisional regret, have been primarily retrospective[12-15] and have included women with hereditary breast cancer, for example, *BRCA 1/2* mutation carriers who are at higher risk for contralateral breast cancer.[16,17] In addition, the lack of a prospectively followed control group in these studies limits the ability to ascertain whether CPM is associated with better or worse psychosocial outcomes.[14,18,19] Given the limitations of the current literature, we conducted an ethnically diverse prospective study among women with nonmetastatic nonhereditary breast cancer who did and did not have CPM that examined patient-centered psychosocial outcomes (ie, cancer distress, cancer worry, body image, QOL, decisional satisfaction, and decisional regret) before surgery and at several time points after surgery.

METHODS

Study Population

Participants included women receiving care at a comprehensive cancer center, The University of Texas MD Anderson Cancer Center, and a community-based clinic, Kelsey-Seybold Clinic, in Houston, Texas, between March 2014 and December 2015. Women were recruited at their initial surgical appointment or shortly after the appointment once they had a known breast cancer diagnosis. Inclusion criteria were newly diagnosed ductal carcinoma in situ or stage I to III unilateral breast cancer; 18 years of age or older; and able to speak, read, and write in English. Women were excluded if they had a prior history of breast cancer or prophylactic mastectomy or were known to have tested positive for a germline mutation that predisposed them to an increased risk of breast cancer (eg, *BRCA1/2*), or if they were considered at high risk for contralateral breast cancer on the basis of a strong cancer family history of cancer.[20]

Recruitment and Study Procedures

Potential participants were identified through clinic schedules and were recruited at their initial surgeon's appointment or shortly after the appointment once they had a confirmed breast cancer diagnosis. Patients were asked to complete questionnaires at five time points: baseline (at study enrollment, before surgery) and approximately 1, 6, 12, and 18 months after their surgery. Participants received $20 compensation for completing each study questionnaire. The study was approved by the institutional review board at participating institutions.

Measures

Participants provided demographic information (ie, age, race, ethnicity, marital status, and education). Clinical data (ie, stage, receipt of chemotherapy, type of surgery, and estrogen receptor and progesterone receptor status) were collected from patients' medical records. The primary psychosocial measures were cancer worry and cancer-specific distress. Cancer worry was measured with a four-item scale that assessed the extent

Table 1. Demographic and Clinical Characteristics (n = 288)

Variable	Total (N = 288)	CPM		P
		Yes (n = 50)	No (n = 238)	
Mean age at diagnosis, years (SD)	55.97 (11.87)	49.76 (11.35)	57.27 (11.59)	< .01
Race				.02
Non-Hispanic white	167 (58)	22 (44)	145 (61)	
Non-Hispanic black	49 (17)	7 (14)	42 (18)	
Hispanic	49 (17)	16 (32	33 (14)	
Other	23 (8)	5 (10)	18 (7)	
Education				.74
< High School	12 (4)	1 (2)	11 (5)	
High school/some college	131 (46)	25 (50)	106 (44)	
College/graduate	145 (50)	24 (48)	121 (51)	
Employment				.19
Employed	165 (57)	33 (66)	132 (55)	
Unemployed	61 (21)_	11 (22)	50 (21)	
Retired/disabled	62 (22)	6 (12)	56 (24)	
Marital status				.62
Married/living with partner	216 (75)	39 (78)	177 (74)	
Single/divorced	71 (24)	11 (22)	60 (25)	
Missing	1 (1)	—	1 (1)	
Annual income ($)				.45
< 30,000	54 (19)	12 (24)	42 (18)	
30,000-75,000	96 (33)	14 (28)	82 (34)	
> 75,000	119 (41)	18 (36)	101 (42)	
Missing	19 (7)	6 (12)	13 (6)	
Family history of cancer				.16
Yes	72 (25)	14 (28)	58 (24)	
No	215 (74)	35 (70)	180 (76)	
Missing	1 (1)	1 (2)	—	
Stage				.36
0	55 (19)	12 (24)	43 (18)	
I	107 (37)	19 (38)	88 (37)	
II	106 (37)	14 (28)	92 (39)	
III	20 (7)	5 (10)	15 (6)	
Hormone receptor status				0.10
ER and PR negative	52 (18)	13 (26)	39 (16)	
ER and/or PR positive	234 (81)	36 (72)	198 (83)	
Missing	2 (1)	1 (2)	1 (1)	
Type of surgery				< .01
Bilateral mastectomy	50 (17)	50 (100)	163 (69)	
Unilateral mastectomy	163 (57)	—	75 (31)	
Breast conserving	75 (26)	—		
Chemotherapy				.47
Yes	142 (49)	27 (54)	115 (48)	
No	146 (51)	23 (46)	123 (52)	
Breast reconstruction				< .01
Yes	86 (30)	41 (82)	45 (19)	
No	202 (70)	9 (8)	193 (81)	

NOTE. All values are No. (%) unless otherwise stated.
Abbreviations: CPM, contralateral prophylactic mastectomy; ER, estrogen receptor; PR, progesterone receptor; SD, standard deviation.

to which worry about breast cancer interferes with women's daily functioning.[21,22] Higher scores indicate more worry. Cancer-specific distress was measured using the Impact of Events Scale (IES),[23] which has been used frequently with different cancer populations.[24,25] The IES assesses subjective distress and includes two common categories of responses to stressful events, intrusion and avoidance symptoms. For our analyses, we used the total IES score, with higher scores indicating more distress.

Secondary psychosocial measures included body image concerns, QOL, decisional satisfaction, and decisional regret. The Body Image Scale[26] is a 10-item scale that assesses body image concerns. It has been used frequently in cancer populations,[27] and higher scores indicate poorer body image. QOL was assessed with the Functional Assessment of Cancer Therapy–Breast (version 4), a multidimensional scale that assesses physical, social, emotional, and functional well-being and breast cancer–specific concerns.[28,29] We used the total score; higher scores on the Functional Assessment of Cancer Therapy–Breast indicate better QOL. Decisional regret was measured with the five-item Decision Regret Scale,[30] and treatment satisfaction was assessed with the Satisfaction With Decision Scale,[31] with higher scores indicating greater regret and satisfaction with the treatment decision, respectively.

Data Analysis

Frequencies and percentages are reported for categorical variables. Summary statistics, such as mean and standard deviation, are provided for continuous data. The χ^2 test and Fisher's exact test were used to evaluate the association between categorical variables and CPM status. For purposes of analysis, we identified two subgroups of women, that is, a CPM group for those women who had CPM and a non-CPM group for those women who opted not to have CPM. The Wilcoxon rank sum test was used to compare the distributions of continuous variables (such as psychosocial scores at each time point) between the CPM and non-CPM groups. The Kruskal-Wallis test was used to compare the distributions of psychosocial scores among different time points. Univariable and multivariable repeated measures models were fitted to assess the association between psychosocial scores and CPM status over different time points without and with adjusting the other covariables (age, race/ethnicity, and stage). A mixed linear model was used for the analysis of repeated measures on the basis of compound symmetry covariance structure assuming that missing of the survey outcomes at various time points is random. The two primary outcomes were cancer worry and distress. Multiple time points when the psychosocial scores were measured were treated as a categorical variable in the model. The interaction between CPM group and time point was also assessed and was included in the repeated measures models if the interaction was statistically significantly associated with the psychosocial scores. Mean and standard error plots over time for cancer worry and QOL scores were generated for the CPM and non-CPM groups. All tests were two-sided. *P* values < .05 were considered statistically significant. All analyses were conducted using SAS 9.4 (SAS, Cary, NC) software.

On the basis of our previous studies, we assumed a CPM rate of 15% and attrition rate of 10%.[8] For comparisons of these two groups of women, a sample size of 216 (32 in the CPM group and 184 in the non-CPM group) at 12 months postsurgery was estimated to provide 80% power to detect an effect size of 0.54 or greater.

RESULTS

Study Sample

We approached 465 women and 345 (85%) consented. Reasons for refusal included too busy (n = 21), not interested (n = 23), too overwhelmed with diagnosis of breast cancer (n = 11), and other reasons (n = 7). Others did not give a reason or were ineligible. Thirty-seven women were determined ineligible for participation after enrollment, and 20 women were excluded after signing informed consent because they did not complete survey measures at any study time point. Therefore, 288 women were included in the final study analysis (Fig 1).

Table 2. Psychosocial Scores Before Surgery and 1, 6, 12, and 18 Months After Surgery by CPM Status

		Presurgery			T1			T2			T3			T4		
Psychosocial Outcome	CPM	No.	Mean (SD)	*P*	No.	Mean (SD)	*P*	No.	Mean (SD)	*P*	No.	Mean (SD)	*P*	No.	Mean (SD)	*P*
Cancer distress	No	207	24.62 (16.52)	.04	210	19.45 (14.55)	.26	218	18.18 (15.93)	.01	214	17.15 (15.30)	.04	166	15.90 (15.26)	< .01
	Yes	44	30.05 (16.91)		44	22.32 (15.21)		47	23.85 (15.64)		44	23.02 (17.02)		29	24.48 (13.76)	
Cancer worry	No	207	7.74 (2.94)	< .01	210	6.55 (2.35)	.07	217	6.19 (2.26)	.58	211	6.18 (2.26)	046	166	5.72 (1.98)	.93
	Yes	43	9.77 (3.61)		43	6.28 (3.24)		44	5.98 (2.13)		42	6.07 (2.70)		27	5.85 (2.25)	
Body image	No	196	3.40 (4.91)	< .01	210	6.60 (7.10)	< .001	218	6.85 (7.03)	< .001	212	6.26 (6.61)	< .001	166	6.11 (7.03)	< .001
	Yes	43	8.26 (9.01)		44	14.00 (8.81)		46	13.76 (9.43)		44	13.20 (7.87)		29	15.52 (8.83)	
Quality of life	No	204	112.62 (17.73)	.13	208	110.78 (18.87)	< .001	217	110.76 (19.60)	.02	213	113.82 (19.41)	.02	167	116.96 (17.47)	< .001
	Yes	44	105.50 (24.35)		42	94.67 (23.77)		47	101.13 (25.32)		44	105.16 (24.22)		30	103.43 (20.87)	
Decision satisfaction	No		_		207	4.30 (0.80)	.67	215	4.35 (0.74)	.92	209	4.32 (0.78)	.49	166	4.29 (0.79)	.64
	Yes				44	4.27 (1.02)		46	4.25 (1.00)		43	4.42 (0.80)		29	3.95 (1.36)	
Decision regret	No		_		209	16.96 (19.57)	.37	216	18.10 (20.65)	.62	208	17.28 (19.17)	.33	166	18.31 (22.16)	.19
	Yes				44	12.95 (15.79)		45	16.89 (21.22)		44	21.82 (23.53)		29	23.45 (23.53)	

NOTE. T1 = 1 month postsurgery; T2 = 6 months postsurgery; T3 = 12 months postsurgery; T4 = 18 months postsurgery.
Abbreviations: CPM, contralateral prophylactic mastectomy; SD, standard deviation.

Demographic and Clinical Characteristics of Participants

Participants' mean age at breast cancer diagnosis was 56 years (range, 25 to 82 years), 58% were non-Hispanic white, 75% were married or living with a partner, 50% had completed college or higher, and 57% were employed full or part time (Table 1). Seventy-five percent reported having a family history of some type of cancer, including breast cancer (women with multiple first-degree relatives with breast cancer were not included in this study). Most women (82%) had estrogen receptor–positive/progesterone receptor–positive breast cancers. Fifty women had CPM; five delayed CPM ≥ 6 months after their primary breast cancer surgery. Twenty percent of the women who had unilateral mastectomy and 79% with CPM had immediate reconstruction. Women who had CPM were more likely to be younger ($P < .01$) and Hispanic ($P < .02$) than women who did not have CPM. There were no other differences in demographic or clinical characteristics between the CPM and non- CPM groups.

Psychosocial Scores Over Time by CPM Status

Among all patients, levels of cancer distress, cancer worry, body image, and QOL changed significantly over time ($P < .01$; Table 2). Women who had CPM had higher cancer distress ($P = .04$), cancer worry ($P < .001$), and body image distress ($P < .001$) before surgery than women who did not have CPM. At 6, 12, and 18 months postsurgery, women who had CPM had higher cancer distress ($P = .01$, $P = .04$, $P = .002$, respectively), higher body image concerns ($P < .001$, $P < .001$, $P < .001$, respectively), and lower QOL ($P = .02$, $P = .02$, $P < .001$, respectively) than women who did not have CPM. There was no statistically significant difference in cancer worry at 6, 12, and 18 months between women who had CPM and those who did not. There were also no significant differences between women who had CPM and those who did not in decisional satisfaction or decisional regret at any time point.

Univariable and Multivariable Repeated Measures Models

In a univariable repeated measures model (Table 3), patients who had CPM had an overall increase in cancer distress ($P = .01$), increase in body image concerns ($P < .001$), and decrease in QOL ($P = .002$) compared with those who did not have CPM. There was a significant interaction between time point and CPM group for cancer worry ($P_{interaction} < .001$) and QOL ($P_{interaction} = .04$). These results indicate that the changes in cancer worry and QOL (Fig 2) that occurred from presurgery to postsurgery differed between women who had CPM versus those who did not.

In a multivariable repeated measures model, younger age was significantly associated with more distress, more cancer worry, more body image concerns, and poorer QOL (all $P < .001$) (Table 4). In addition, adjusting for time point, age, race/ethnicity, and stage of disease, having CPM was associated with an increase in body image concerns ($P < .001$) and a decrease in QOL ($P = .02$) compared with not having CPM. There was no significant association between having CPM or not for cancer distress ($P > .10$). The interaction between time point and CPM was still significantly associated with cancer worry ($P_{interaction} < .001$) and QOL ($P_{interaction} < .05$). These results indicate that the higher cancer worry before surgery in women having CPM decreased over time and became similar to the cancer worry of patients who did not have CPM. QOL was similar between CPM groups before surgery, but declined after surgery among women who had CPM and remained lower than the QOL in women who did not have CPM in the 18 months after surgery (Table 4). We conducted sensitivity analyses to examine the effects when excluding the five delayed CPM patients. Results were consistent except that the interaction between time and CPM was no longer statistically significant for QOL, although the mean scores were in the same direction, likely because of reduced statistical power (data not shown).

Table 3. Longitudinal Univariable Analysis of Psychosocial Outcomes Over Time by CPM Group, Including Time Effect and Interaction of Time and CPM Group

Variable	Mean Difference (95% CI)*	P
Cancer distress		
CPM (yes *v* no)	5.2 (1.1 to 9.2)	.01
T1 (*v* presurgery)	−5.9 (−8.4 to −3.3)	< .001
T2 (*v* presurgery)	−6.3 (−8.9 to −3.7)	< .001
T3 (*v* presurgery)	−7.4 (−10.2 to −4.6)	< .001
T4 (*v* presurgery)	−7.4 (−10.1 to −4.7)	< .001
CPM × time interaction		.43
Cancer worry		
CPM (yes *v* no)	0.2 (−0.4 to 0.9)	.45
T1 (*v* presurgery)	−2.3 (−2.8 to −1.8)	< .001
T2 (*v* presurgery)	−2.7 (−3.2 to −2.2)	< .001
T3 (*v* presurgery)	−2.7 (−3.2 to −2.1)	< .001
T4 (*v* presurgery)	−3.1 (−3.7 to −2.5)	< .001
CPM × time interaction		< .001
Body image		
CPM (yes *v* no)	6.6 (4.4 to 8.9)	< .001
T1 (*v* presurgery)	4.9 (3.6 to 6.1)	< .001
T2 (*v* presurgery)	4.6 (3.5 to 5.6)	< .001
T3 (*v* presurgery)	4.0 (2.8 to 5.2)	< .001
T4 (*v* presurgery)	4.6 (3.2 to 6.0)	< .001
CPM × time interaction		.06
Quality of life		
CPM (yes *v* no)	−9.9 (−16.2 to −3.6)	.002
T1 (*v* presurgery)	−7.1 (−1.0 to −4.3)	< .001
T2 (*v* presurgery)	−3.8 (−6.5 to −1.0)	.008
T3 (*v* presurgery)	−0.01 (−2.9 to 2.8)	.10
T4 (*v* presurgery)	0.9 (−2.4 to 4.2)	.60
CPM × time interaction		.04
Decision satisfaction		
CPM (yes vs no)	−0.1 (−0.3 to 0.1)	.28
T2 (*v* T1)	0.02 (−0.2 to 0.2)	.85
T3 (*v* T1)	0.07 (−0.1 to 0.3)	.48
T4 (*v* T1)	−0.2 (−0.5 to 0.1)	.20
CPM × time interaction		.42
Decision regret		
CPM (yes *v* no)	1.3 (−3.5 to 6.2)	.59
T2 (*v* T1)	2.4 (−1.4 to 6.2)	.21
T3 (*v* T1)	4.6 (0.5 to 8.7)	.03
T4 (*v* T1)	6.0 (1.8 to 10.3)	.01
CPM × time interaction		.11

Abbreviation: CPM, contralateral prophylactic mastectomy.
*95% CI is for the estimated mean difference of each variable (eg, between T1 and presurgery, or CPM and no CPM).

DISCUSSION

Our results suggest that CPM may affect psychosocial adjustment in the 18 months after breast cancer surgery in several key areas. Those who chose CPM had greater cancer worry, more cancer distress, and greater body image concerns before the surgery than

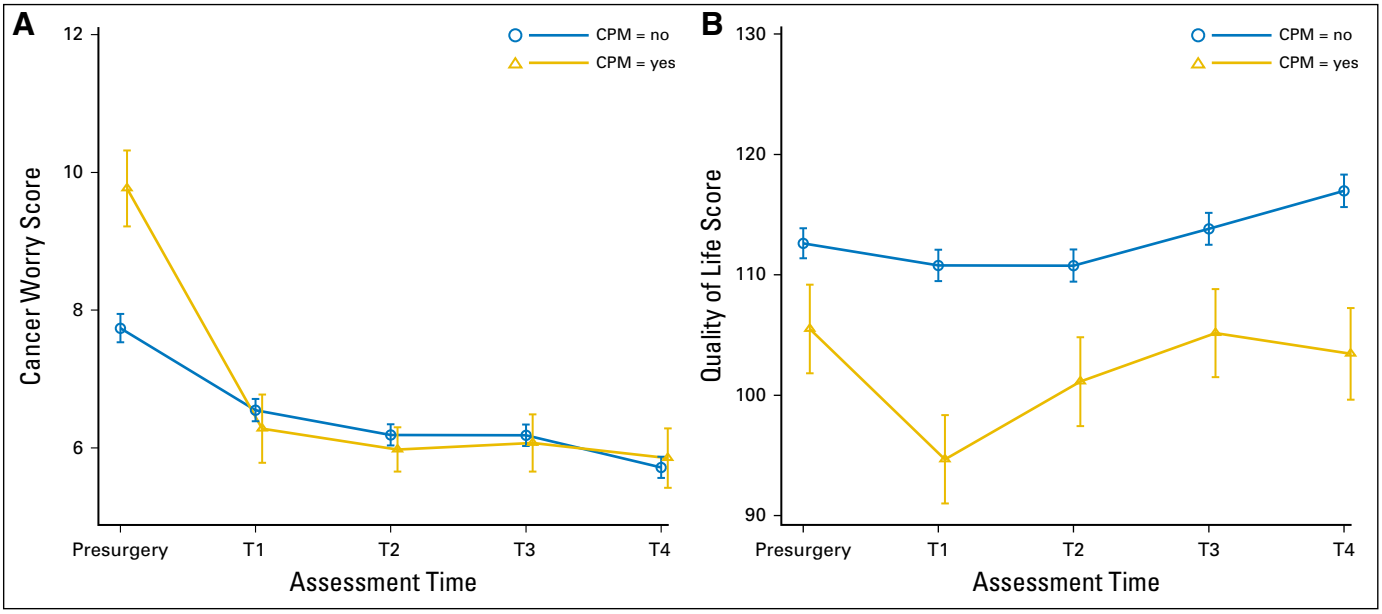

Fig 2. (A) Mean ± SE cancer worry scores over time by contralateral prophylactic mastectomy (CPM) group. (B) Mean ± SE quality of life scores over time by CPM group. T1 = 1 month postsurgery; T2 = 6 months postsurgery; T3 = 12 months postsurgery; T4 = 18 months postsurgery.

those who did not have CPM. This finding is consistent with prior research from our group[8] and others,[32-34] and indicates that cancer worry is an important psychosocial factor motivating the decision to have CPM. In the 18 months after surgery, cancer worry decreased in women who had CPM and then levels were similar to women who did not have CPM, indicating that a potential psychosocial benefit of having CPM is a reduction in persistent worry about breast cancer. Although cancer worry decreased for women who had CPM, they had a decrease in overall QOL in the first 18 months after surgery. Thus, although women may experience reduced worry about breast cancer after CPM, they may still experience declines in their QOL (physical, social, emotional, and functional well-being).

Women who had CPM had higher body image concerns compared with women who did not have CPM before surgery, and their concerns persisted in the 18 months after surgery. This is consistent with other studies that have shown persistent body image concerns after surgery among women who had CPM.[35-37] Unukovych et al,[35] for example, prospectively followed 60 women who had CPM, of whom more than half reported at least one body image problem 2 years postoperatively. However, there was no control group, and body image was not assessed before surgery. Our results on QOL differ from a retrospective cross-sectional study that evaluated QOL using the BREAST-Q tool among breast cancer survivors and showed that the CPM group reported higher breast satisfaction and psychosocial well-being than the non-CPM group.[18] Survivors were surveyed at a median time of 4.6 years after breast surgery, with potential for recall bias, although QOL may improve with longer time from surgery. In our study, there were no differences in decisional regret or decisional satisfaction between women who had CPM versus those who did not, consistent with studies that have found women tend to be satisfied with CPM and have low decisional regret.[14,15,38]

An important strength of this study is that we recruited women from both an academic practice and a community hospital setting, increasing the generalizability of our results. In addition, our participants were ethnically diverse and, notably, we found that Hispanic women in our study were more likely to have CPM than women who were non-Hispanic white. This is in contrast to other studies that have shown higher CPM rates among non-Hispanic white women compared with women of other races/ethnicities.[7,39-41] Possible explanations for the difference in our findings and others may be that our participants had to be English speaking or that we included women from both academic and community settings. This is an intriguing finding that should be explored in future studies as trends change over time. Reports have shown that the trend in CPM use has increased over time in all racial/ethnic groups[42] and understanding ethnic and cultural-related factors associated with the decision to have CPM is an important direction for future studies.

Limitations of our study should be noted. First, some women who enrolled in this study failed to complete any questionnaires. Although there were no apparent demographic differences between such women and those who returned surveys, it is possible that women who did not contribute any data had different psychosocial experiences. In addition, the study was statistically powered to detect differences in cancer worry and distress among patients who did and did not have CPM; given the multiple additional tests, the results of the secondary outcomes should be interpreted with caution. We followed the majority of women for 18 months postsurgery, and it is unknown whether differences in psychosocial adjustment between women having CPM and not having CPM might emerge with longer follow-up after breast cancer surgery. In addition, as mentioned previously, we recruited only English-speaking patients; therefore, results may differ among Hispanic women who did not speak English or other non–English-speaking women. Finally, there were factors not assessed in this study, such as physician recommendation for or against CPM, patient comorbidities, and the influence of the type and timing of chemotherapy on the psychosocial outcomes. The majority of women

Table 4. Multivariable Longitudinal Analyses Using Mixed Repeated Measures Models to Evaluate the Associations Between CPM Group and Psychosocial Outcomes

	Cancer Distress (n = 1,223)*			Cancer Worry (n = 1,210)*			Body Image (n = 1,209)*			Quality of Life (n = 1,216)*		
Variable	Mean Difference	95% CI	*P*	Mean Difference	95% CI	*P*	Mean Difference	95% CI	*P*	Mean Difference	95% CI	*P*
CPM yes (*v* no)	2.80	−1.32 to 6.98	.18	−0.22	−0.85 to 0.41	.49	5.89	3.60 to 8.19	< .01	−7.92	−14.31 to -1.52	.02
Assessment of time effect												
T1 (*v* presurgery)	−5.03	−6.89 to -3.17	< .01	−2.31	−2.83 to -1.79	< .01	4.00	3.16 to 4.85	< .01	−7.11	−9.98 to -4.25	< .01
T2 (*v* presurgery)	−6.22	−8.27 to -4.18	< .01	−2.73	−3.24 to -2.21	< .01	3.96	3.15 to 4.77	< .01	−3.75	−6.51 to -0.98	< .01
T3 (*v* presurgery)	−7.54	−9.49 to -5.59	< .01	−2.70	−3.25 to -2.14	< .01	3.38	2.58 to 4.19	< .01	0.00	−2.84 to 2.86	.99
T4 (*v* presurgery)	−8.10	−10.20 to -6.00	< .01	−3.14	−3.76 to -2.53	< .01	3.43	2.59 to 4.27	< .01	0.94	−2.33 to 4.21	.57
CPM × time interaction			†			< .001			†			.047
Age (year)	−0.32	−0.45 to -0.18	< .01	−0.05	−0.07 to -0.04	< .01	−0.10	−0.17 to -0.04	< .01	0.25	0.07 to 0.43	< .01
Race/ethnicity												
Black, non-Hispanic (*v* white, non-Hispanic)	−0.83	−4.84-3.17	.68	0.09	−0.54 to 0.72	.77	−0.006	−2.13 to 2.12	.99	−0.97	−6.64 to 4.69	.73
Hispanic (*v* white, non-Hispanic)	−0.69	−5.23 to 3.85	.76	−0.72	−1.34 to -0.11	.02	−0.81	−2.77 to 1.15	.42	−0.36	−6.36 to 5.64	.91
Other/missing (*v* white, non-Hispanic)	−1.94	−6.72 to 2.84	.42	−0.07	−0.90 to 0.75	.86	−0.61	−2.87 to 1.65	.60	0.47	−6.55 to 7.50	.89
Stage												
I (*v* 0)	1.02	−2.56 to 4.62	.57	0.39	−0.12 to 0.91	.14	−0.17	−1.91 to 1.57	.85	0.56	−4.14 to 5.27	.81
II (*v* 0)	−2.07	−8.22-4.09	.51	−0.01	−0.87 to 0.83	.97	−1.25	−3.75 to 1.25	.33	−3.03	−10.96 to 4.89	.45
III (*v* 0)	−0.42	−4.49 to 3.64	.84	−0.38	−0.92 to 0.15	.16	−1.76	−3.51 to -0.001	.05	2.96	−2.49 to 8.42	.29

NOTE. T1 = 1 month postsurgery; T2 = 6 months postsurgery; T3 = 12 months postsurgery; T4 = 18 months postsurgery.
Abbreviations: CPM, contralateral prophylactic mastectomy.
*The number of observations used in the model for each outcome score.
†The interaction between CPM and time point was not statistically significant in cancer distress scores and body image scores in univariable analyses; therefore, it was not included in the multivariable model for cancer distress and body image.

in our study who received CPM had reconstruction, which in turn may have negatively affected psychosocial adjustment over the 18-month postsurgery period.[43-47] Because women in the United States who have CPM tend to opt for reconstruction,[48-50] the psychosocial results may be generalizable to the wider CPM population, although the effect of type of reconstruction performed remains an important area for future research.

In conclusion, the results of this prospective study are highly relevant to clinical practice and should be used to better inform discussions between women and physicians regarding CPM. Fear and worry regarding breast cancer may be foremost concerns at the time surgical decisions are made, and women may not anticipate the effect of CPM on QOL. Incorporating discussions about psychosocial outcomes, such as cancer worry, QOL, and body image concerns, in addition to clinical outcomes, may enable women to fully consider the psychosocial effect of having CPM. For women experiencing high levels of cancer worry, psychological interventions that directly address cancer worry and concerns about body image may be warranted.

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AUTHOR CONTRIBUTIONS

Conception and design: Patricia A. Parker, Susan K. Peterson, Yu Shen, Isabelle Bedrosian, Robert J. Volk, Scott B. Cantor, Wenli Dong, Abenaa M. Brewster
Collection and assembly of data: Patricia A. Parker, Isabelle Bedrosian, Dalliah M. Black, Alastair M. Thompson, Jonathan C. Nelson, Sarah M. DeSnyder, Robert L. Cook, Kelly K. Hunt, Abenaa M. Brewster
Data analysis and interpretation: Patricia A. Parker, Yu Shen, Kelly K. Hunt, Scott B. Cantor, Wenli Dong, Abenaa M. Brewster
Manuscript writing: All authors
Final approval of manuscript: All authors
Accountable for all aspects of the work: All authors

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Affiliations

Patricia A. Parker, Memorial Sloan Kettering Cancer Center and Weill Cornell Medical College, New York, NY; **Susan K. Peterson**, **Yu Shen**, **Isabelle Bedrosian**, **Dalliah M. Black, Alastair M. Thompson**, **Sarah M. DeSnyder**, **Kelly K. Hunt**, **Robert J. Volk**, **Scott B. Cantor, Wenli Dong**, and **Abenaa M. Brewster**, The University of Texas MD Anderson Cancer Center; and **Jonathan C. Nelson** and **Robert L. Cook**, Kelsey-Seybold Clinic, Houston, TX.

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Prospective Study of Psychosocial Outcomes of Having Contralateral Prophylactic Mastectomy Among Women With Nonhereditary Breast Cancer

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